

What is claimed is:

1 1. A method, comprising:
2 forming a trench in a semiconductor substrate surface;
3 depositing a dielectric material onto the
4 semiconductor substrate surface and into the trench;
5 implanting ions into at least some of the dielectric
6 material to form an implanted dielectric region; and
7 polishing the semiconductor substrate surface to
8 remove at least some of the implanted dielectric region.

1 2. The method of claim 1, wherein forming the trench
2 comprises forming a barrier layer on the semiconductor
3 substrate surface.

1 3. The method of claim 2, further comprising
2 implanting ions into at least some of the barrier layer.

1 4. The method of claim 2, wherein implanting ions
2 comprises implanting ions at least as deep as the barrier
3 layer.

1 5. The method of claim 1, wherein the semiconductor
2 substrate is a silicon wafer, and forming the trench
3 comprises patterning a mask layer on a surface of the
4 silicon wafer such that at least one region of the surface
5 is exposed, and etching the trench in the exposed region.

1 6. The method of claim 1, wherein implanting ions
2 comprises implanting silicon.

1 7. The method of claim 1, wherein implanting ions
2 comprises implanting carbon.

1 8. The method of claim 1, wherein implanting ions
2 comprises implanting oxygen.

1 9. The method of claim 1, wherein implanting ions
2 comprises implanting nitrogen.

1 10. A method, comprising:
2 forming a nitride layer on a silicon wafer surface,
3 the nitride layer having a first polish rate;
4 etching a plurality of recesses in the silicon wafer
5 surface;
6 forming an oxide layer on the silicon wafer surface
7 and in the plurality of recesses, the oxide layer having a
8 second polish rate;
9 implanting ions into at least one of the nitride layer
10 and the oxide layer to form an implanted region having a
11 third polish rate different from the first and second
12 polish rates; and

13 polishing the silicon wafer surface to remove at least
14 some of the oxide layer and at least some of the implanted
15 region therefrom.

1 11. The method of claim 10, wherein polishing
2 comprises removing at least some of the nitride layer.

1 12. The method of claim 10, wherein polishing
2 comprises chemical mechanical polishing.

1 13. The method of claim 10, wherein the ions are
2 selected from the group consisting of silicon, carbon,
3 nitrogen, and oxygen.

1 14. The method of claim 10, wherein implanting ions
2 changes one of the first and second polish rates relative
3 to the other polish rate.

1 15. An apparatus comprising:
2 a semiconductor substrate having a barrier layer
3 formed thereon;
4 a trench etched into the substrate adjacent the
5 barrier layer;
6 a dielectric layer deposited over the barrier layer
7 and trench; and

8 a plurality of ions implanted into the dielectric
9 layer.

1 16. The apparatus of claim 14 further comprising a
2 plurality of ions implanted into the barrier layer.

1 17. The apparatus of claim 14 wherein the barrier
2 layer comprises a silicon nitride layer.

1 18. The apparatus of claim 14 wherein the dielectric
2 layer comprises a silicon oxide layer.

1 19. The apparatus of claim 14 wherein the dielectric
2 layer is damaged by the plurality of implanted ions.

1 20. The apparatus of claim 14 wherein the plurality
2 of ions are selected from the group consisting of silicon,
3 carbon, nitrogen, and oxygen.